WEST MICHIGAN TRAFFIC MANAGEMENT CENTER

ANNUAL REPORT FISCAL YEAR 2007

Prepared For:

MDOT
Michigan Department of Transportation

MICHIGAN DEPARTMENT OF TRANSPORTATION
GRAND REGION OFFICE
GRAND RAPIDS, MICHIGAN

Prepared By:

URS

DETROIT – FARMINGTON HILLS – GRAND RAPIDS – TRAVERSE CITY

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1. PURPOSE

The Michigan Department of Transportation (MDOT) Grand Region operates the West Michigan Traffic Management Center (WMTMC), which is co-located with the Grand Region Office north of downtown Grand Rapids, Michigan. The WMTMC strives to improve the performance and safety of the Grand Rapids metropolitan area freeway system by utilizing the latest developments in transportation technologies and strengthening inter-agency cooperation and collaboration. The goals of the WMTMC include decreasing incident response times, reducing secondary collision rates, informing motorists of current traffic conditions, and reducing congestion along freeways throughout the region.

This report presents an overview of WMTMC operations during MDOT Fiscal Year (FY) 2007 (October 1, 2006 – September 30, 2007). Current WMTMC operations include daily control room functions, traffic incident management, special events, and messaging for construction activities.

2. CONTROL ROOM OPERATIONS

The WMTMC collects and disseminates travel information across approximately 20 miles of freeway in the Grand Rapids Metropolitan Area. Data collection resources include CCTV traffic cameras, MDOT employees, county and city road agencies, law enforcement, media traffic partners, and a variety of other organizations. Control Room Operators at the WMTMC manage incidents and disseminate real-time travel information via Dynamic Message Signs (DMS) strategically located throughout the freeway system, Variable Speed Signs (VSS) along the US-131 S-Curve, and communication with media partners, law enforcement, and other local and county agencies. The locations of existing traffic cameras and DMSs, as well as the operating hours of the control room, can be found in Appendix A, *Fiscal Year 2007 Performance Measures Report.*

3. CONTROL ROOM COMMUNICATIONS

A key function of daily control room operations involves Control Room Operators communicating in real-time with law enforcement and media partners as traffic incidents unfold. When Control Room Operators are able to detect and verify a traffic incident, they assist in coordinating emergency response with the Grand Rapids Police Dispatch (GRPD) and the Michigan State Police (MSP), provide traffic information to local media partners, and continue to monitor the incident scene for the purpose of updating DMS messages and incident notifications. In addition, Control Room Operators communicate with project engineers and contractors working on a number of road construction projects, maintenance crews working along the highways in the region, and personnel in charge of maintaining and repairing ITS devices. The WMTMC control room also communicates on occasion with agencies, such as the West Michigan Clean Air Coalition (WMCAC) in reference to Ozone Action Days, utility companies regarding power to ITS field devices, and the Michigan ITS Center (MITSC) in Detroit. During FY 2007, the control room handled approximately 1500 incoming and outgoing

calls. In addition to phone calls, a significant amount of control room communication is via email. For FY 2008, email communication is being logged as well.

Control Room Operators also have the ability to communicate via an 800-MHz radio that was added to the control room during FY 2007. Although the radio will mostly be used as a backup system to other forms of communication, it is still an important tool for ensuring the ability of the control room to communicate in the event of an emergency.

WMTMC Control Room Operators maintain a Call Log of all incoming and outgoing telephone calls to and from the control room, including the name, phone number, and agency of each person. The number of calls received by the control room is an indicator of control room activity, including construction, incident frequency, ITS system maintenance, and a number of other factors. An example of the WMTMC control room call log is shown below in Figure 1, and a breakdown of the number of calls by category during FY 2007 is provided in Table 1.

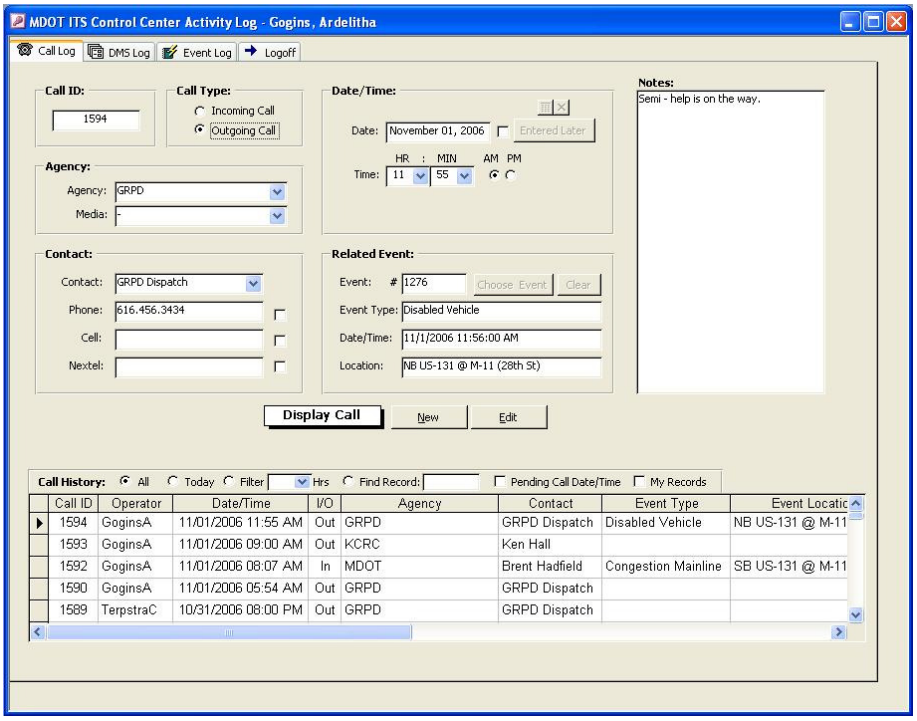

Figure 1. WMTMC Control Room Call Log.

Table 1. Distribution of WMTMC Control Room Telephone Calls

Agency	In	Out	Total
City of Grand Rapids	5	1	6
City of Wyoming	0	15	15
Grand Rapids Police Department	71	774	845
Kent County Road Commission	10	12	22
MDOT, Construction	104	46	150
MDOT, Traffic/ITS	17	3	20
MDOT, Maintenance	9	7	16
MDOT, Other	3	2	5
Media	34	3	37
Michigan State Police	13	158	171
Sheriff, Kent Co.	1	3	4
URS Corporation	63	16	79
ITS System Maintenance	34	86	120
Other	23	9	32
Fiscal Year Total	**387**	**1135**	**1522**

4. CAMERA AND SIGN OPERATIONS

The WMTMC utilizes a network of ITS devices to monitor traffic conditions throughout the Grand Rapids area and inform motorists of important traffic situations. ITS field devices are connected to the WMTMC via a combination of fiber optic and wireless connections. At the end of FY 2007, the ITS network covered approximately 20 centerline miles of freeway in the Grand Rapids metropolitan area, and included:

- 17 traffic cameras
- 10 dynamic message signs
- 4 variable speed signs

There was not any new construction within the existing ITS network during FY 2007. However, design began on a project to add additional cameras and a sign to the network, and repair several older signs along US-131. Design will be completed and construction will occur during FY 2008. In addition, design work also started on a second project that will expand the current ITS network and will add dozens of ITS devices, including cameras and signs, throughout the region. This project is expected to start in FY 2009.

The WMTMC utilizes a network video server that allows anyone on the state network to view the same video feeds that the operators are viewing in the control room, without allowing control of the cameras. Since the server is on the state intranet, it is not available to the general public. The server has been helpful in allowing MDOT engineers and MSP dispatchers to gather more accurate information about traffic conditions and incidents without being in the WMTMC control room. The interface for the Axis Video Server is shown in Figure 2.

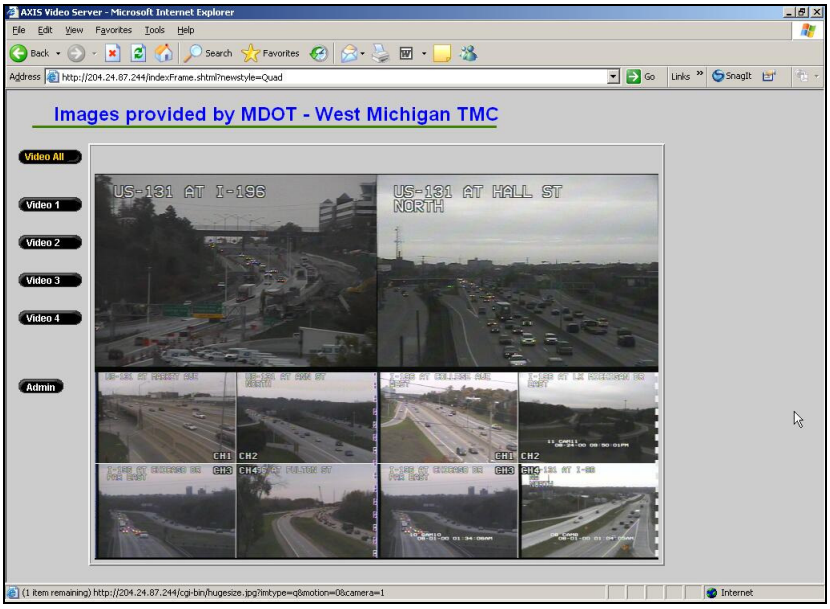

Figure 2. Axis Video Server.

Video feeds are also shared with the media, including radio traffic reporters. Providing access to live video for rush hour traffic reporting is an important aspect in getting real-time information to motorists. Four local television stations have contract agreements in place with MDOT and are currently broadcasting live camera feeds during their news programs. By including images as part of a television traffic report, the public is able to easily observe current traffic conditions and make more informed travel decisions. Each television station is able to select from 16 video feeds of broadcast-quality images using an interface known as PelcoNet. The PelcoNet interface used to select cameras is shown in Figure 3.

Figure 3. PelcoNet Media Interface.

The WMTMC camera images are also made available to the general public via the Mi Drive website, which is located online at www.midrive.org. The images on the Mi Drive website automatically update at a rate of one image every 15 seconds, providing a snapshot of current traffic conditions for motorists while also conserving server bandwidth. The Mi Drive site also contains other traffic information, such as construction closures. As additional equipment is installed and software is upgraded within the ITS network, additional travel information, such as travel speeds, may also be added to the website. A snapshot of the Mi Drive website is shown in Figure 4.

Figure 4. Mi Drive Website

5. ROAD CONSTRUCTION SUPPORT

The WMTMC supports the MDOT Grand Rapids Transportation Service Center (TSC) personnel in providing the best and most up-to-date construction and maintenance work zone information that affects the traveling public. Prior to the start of construction season, a meeting is held with TSC construction and maintenance staff to discuss operational procedures and upcoming projects. Control Room Operators work regularly with project engineers to develop DMS messaging plans for work zones and determine how the WMTMC can assist in alerting drivers of current and upcoming conditions. DMS messaging may include information regarding upcoming lane/road closures or openings, active traffic impacts, detour or alternate route suggestions, or general mobility and traffic backup information.

When construction activities occur during control room hours, operators can monitor work zones for possible problems that may occur and modify DMS messages as necessary. For construction operations on weekends, messages are often scheduled to be activated at a certain date and time. These schedules are based on a plan developed in coordination with the MDOT project engineer. Since construction schedules can sometimes change with little or no notice, in these instances, GRPD Dispatch, which operates 24 hours per day, 7 days per week, can also assist by updating DMS messages as needed.

During FY 2007, the WMTMC assisted the MDOT Grand Rapids TSC by calculating travel times of vehicles as they passed through construction zones. This helped the TSC in determining the delay motorists were experiencing as the result of a particular project. The WMTMC has also assisted the TSC by conducting vehicle counts via traffic camera, verifying crash data, and a number of other traffic-related tasks aimed at increasing safety and reducing congestion in construction zones.

6. PLANNED SPECIAL EVENTS SUPPORT

The WMTMC provides expanded coverage for special events which occur outside of the normal hours of operation. Control Room Operators monitor traffic cameras for abnormal conditions, coordinate with GRPD and MSP regarding ramp and lane closures, and display DMS messages to assist in the flow of event traffic. The WMTMC regularly assists in traffic for the River Bank Run, the Fourth of July fireworks, and the Celebration on the Grand fireworks. In FY 2007, the WMTMC also assisted in traffic operations for the funeral of President Gerald R. Ford on January 2-3, 2007, which had a significant impact on freeway traffic in the Grand Rapids area.

7. INCIDENT MANAGEMENT AND TRAFFIC INFORMATION

Notifications of incidents are sent by the WMTMC to a number of partners for incidents that have a significant impact on traffic flow, including:

- Total closures on freeways and major arterials
- Multiple lane closures on freeways
- Freeway-to-freeway ramp closures

Control Room Operators use email to disseminate this important information to a large number of people at once, including but not limited to law enforcement and emergency responders, MDOT personnel, and local media partners. Notifications are sent throughout the duration of these high impact incidents as conditions change, until the incident has cleared and all lanes and ramps have reopened. Table 2 summarizes the number of high impact incidents per month for which incident notifications were sent during FY 2007.

Table 2. Closures Due To High Impact Incidents.

Incident	Average Month	Highest Month (May '07)	Lowest Month (Feb '07)
Lane Closures	9	17	3
Ramp Closures	1	-	1
Freeway Closures	1	4	1

In addition to the WMTMC Call Log, Control Room Operators also maintain an Event Log that is used to track incidents that occur during control room hours. Incident data entered into the Event Log includes:

- Date and time of incident occurrence, emergency response arrival, and incident clearance
- Incident freeway and location
- Number and type of vehicles involved
- Impact on traffic
- Other important details regarding the incident

The WMTMC also logs other types of events, such as construction activities, atypical congestion, Ozone Action Days, Amber Alerts, and special events. Whenever possible, calls entered into the Call Log are linked to a related activity in the Event Log, providing further details of control room activity. These logs are helpful in identifying the types of activities the control room is assisting in, possible areas for future improvement, and locations where future ITS devices may be most useful. An example of the WMTMC control room Event Log is shown in Figure 5, and a breakdown of the number of events by category during FY 2007 is provided in Figure 6.

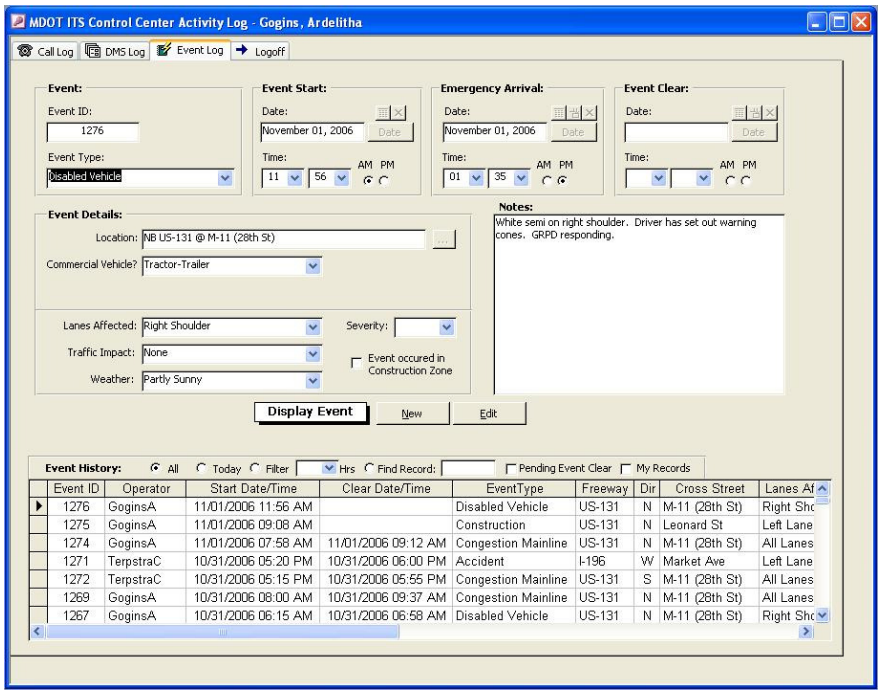

Figure 5. WMTMC Control Room Event Log.

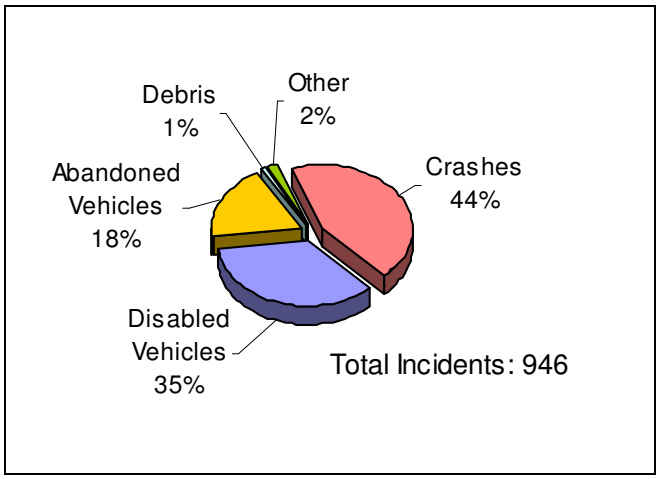

Figure 6. Distribution of WMTMC Control Room Logged Incidents

8. TRAFFIC DETECTION

A key method of obtaining traffic information is automatic detection of current conditions. This is typically done using a network of detectors that are capable of calculating vehicle volumes, speeds, and sizes, that are connected to a traffic management center via a data network. This data can then by used by operators to detect possible incidents and provide up-to-date travel information to the motoring public.

The WMTMC obtained a portable vehicle detection trailer during FY 2007 for the purpose of observing traffic information and sending data to the WMTMC control room. The detection trailer can be set up alongside any roadway, and using microwave radar technology, is able to collect vehicle information, such as volumes and vehicle speeds. The detection trailer is powered via solar panels and batteries, and utilizes a cellular modem to transmit data to the control room.

The design phase of a project to install permanent detectors along area freeways was started in FY 2007. The project is expected to be completed in 2008 and will install more than 40 detectors throughout the Grand Rapids area. Once installed, the detectors will give Control Room Operators the ability to monitor traffic flow throughout the network, more quickly detect and verify incidents, and identify areas where congestion is occurring. The detectors will also allow for the calculation of vehicle travel times, which could be automatically displayed on signs along the freeways in the future.

Design work also started on an ITS expansion project during FY 2007. As part of the project, which is expected to begin in FY 2009, additional traffic detectors will be installed throughout Kent County. The expansion project will allow the WMTMC to monitor new sections of freeways and arterials throughout the area, and to provide additional travel information to the motoring public.

9. SYSTEM MAINTENANCE

Maintenance services for the ITS field devices are provided by the City of Grand Rapids, except for those that are under warranty. Tables 3, 4, and 5 below show the availability of each device during FY 2007. It should be noted that the relatively high unavailability of the CCTV cameras on I-96 at I-196 and Fulton Street was likely the result of a power surge caused by a thunderstorm on August 23, 2007.

Table 3. CCTV Camera Availability.

	Camera	Full	Partial	None
1	US-131 @ 28th St	98.2%	-	1.8%
2	US-131 @ Franklin St	99.2%	-	0.8%
3	US-131 @ Market Ave	99.6%	0.2%	0.2%
4	US-131 @ Pearl St	100.0%	-	-
5	US-131 @ I-196	100.0%	-	-
6	US-131 @ Leonard St	99.6%	0.2%	0.2%
7	US-131 @ Ann St	97.7%	2.0%	0.2%
8	US-131 @ I-96	100.0%	-	-
9	US-131 @ Hall St	99.4%	0.2%	0.4%
10	US-131 @ West River Dr	97.7%	0.4%	1.8%
11	I-196 @ Chicago Dr	99.0%	0.2%	0.8%
12	I-196 @ Lake Michigan Dr	98.0%	1.2%	0.8%
13	I-196 @ Lane Ave	99.0%	0.2%	0.8%
14	I-196 @ College Ave	100.0%	-	-
15	I-196 @ Fuller Ave	99.8%	0.2%	-
16	I-96 @ I-196	88.5%	0.2%	11.3%
17	I-96 @ Fulton St (M-21)	93.9%	5.5%	0.6%

Table 4. DMS Availability.

	DMS	Full	Partial	None
1	WB I-96 @ Fulton St (M-21)	99.0%	-	1.0%
2	WB I-196 @ Chicago Dr	99.2%	0.2%	0.6%
3	EB I-196 @ Plymouth Ave	100.0%	-	-
4	SB US-131 @ West River Dr	95.9%	1.8%	2.3%
5	SB US-131 @ Ann St	99.0%	0.6%	0.4%
6	NB US-131 @ Leonard St	98.4%	0.6%	1.0%
7	SB US-131 @ Pearl St	99.8%	0.2%	-
8	SB US-131 @ Hall St	97.7%	1.8%	0.4%
9	NB US-131 @ 36th St	97.5%	1.8%	0.6%
10	NB US-131 @ 28th St	97.3%	1.4%	1.2%

Table 5. VSS Availability

	VSLS	Full	Partial	None
1	SB US-131 @ Pearl St	100.0%	-	-
2	NB US-131 @ Market Ave	99.4%	-	0.6%
3	SB US-131 @ Market Ave	99.4%	-	0.6%
4	NB US-131 @ Franklin St	97.7%	0.2%	2.0%

It is anticipated that the WMTMC will work with the City of Grand Rapids and URS to develop a preventive maintenance plan and a database to track maintenance activities during FY 2008. This will improve scheduling of preventive maintenance activities with the goal of keeping the system operational as much of the time as possible and reducing the need to fix and repair devices.

10. CONCLUSIONS

The WMTMC provides an important service to law enforcement, emergency responders, media partners, transportation agencies, and the motoring public in West Michigan. Continuing expansion of the ITS network and developments in operations will allow the WMTMC to have an even greater impact on the performance and safety of local freeways and arterials. The WMTMC will strive to further strengthen interagency cooperation and collaboration throughout the region, and to provide enhancements to transportation operations and traveler information throughout the region.

APPENDIX A - FISCAL YEAR 2007 PERFORMANCE MEASURES REPORT

West Michigan TMC

Serving the Grand Rapids Area Freeways

Fiscal Year 2007

Suzette Peplinski, PE
Michigan Department of Transportation
1420 Front Avenue NW
Grand Rapids, MI 49504
PeplinskiS@michigan.gov

Control Room Coverage

The following report is limited to data collected during the hours of operation for the control room and within the ITS device coverage area.

Control Room Hours of Operation

Day	Time Period	Time of Day
Mondays – Thursdays	All	6:00 a.m. to 8:00 p.m.
Fridays	May through Labor Day	6:30 a.m. to 9:00 p.m.
Sundays	May through Labor Day	5:00 p.m. to 8:00 p.m.
Fridays	Labor Day through April	6:30 a.m. to 8:00 p.m.
Sundays	Labor Day through April	None
Special Events	All	As needed
Holidays	New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day.	None

ITS Device Locations and Coverage Area

Compiled by: URS

West Michigan TMC

Fiscal Year 2007

Serving the Grand Rapids Area Freeways

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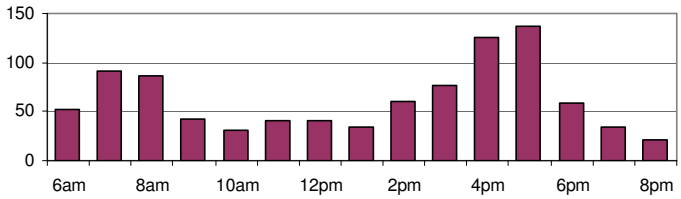
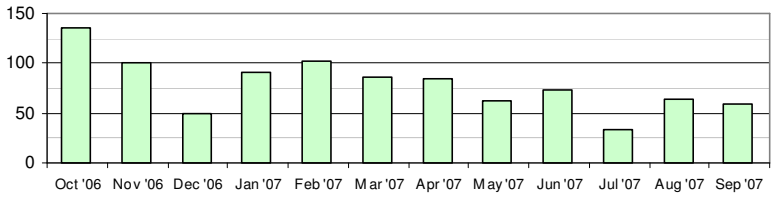
Control Room Support Activity

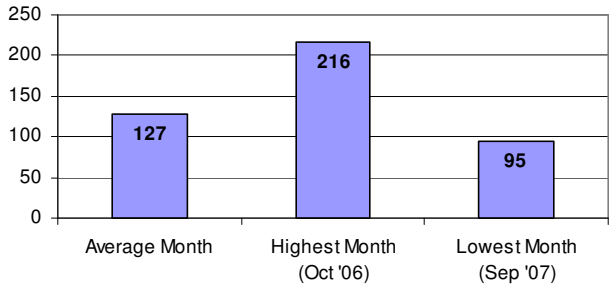
Unplanned Incidents per Weekday Hour



Monthly History of Unplanned Weekday Incidents



Monthly Call History



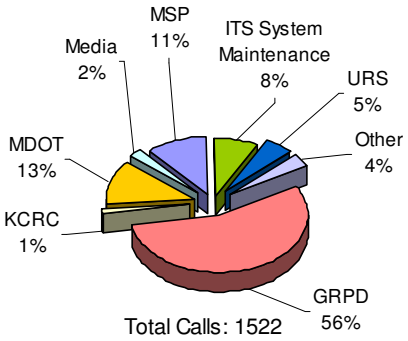
Monthly High Impact Unplanned Incident Activity

Incident	Average Month	Highest Month (Apr '07)	Lowest Month (Jan '07)
Lane Closures	9	17	3
Ramp Closures	1	-	1
Freeway Closures	1	4	1

Total Calls by Type

Agency	In	Out	Total
City of Grand Rapids	5	1	6
City of Wyoming	0	15	15
Grand Rapids Police Department	71	774	845
Kent County Road Commission	10	12	22
MDOT, Construction	104	46	150
MDOT, Traffic/ITS	17	3	20
MDOT, Maintenance	9	7	16
MDOT, Other	3	2	5
Media	34	3	37
Michigan State Police	13	158	171
Sheriff, Kent Co.	1	3	4
URS Corporation	63	16	79
ITS System Maintenance	34	86	120
Other	23	9	32
Fiscal Year Total	**387**	**1135**	**1522**

Total Calls by Type



Monthly Unplanned Incidents by Roadway

Freeway	Average Month		Highest Month (Oct '06)		Lowest Month (Jul '07)	
	Total	per mi.	Total	per mi.	Total	per mi.
I-96 (4.5 mi.)*	5	1.1	4	0.9	2	0.4
I-196 (8.5 mi.)*	22	2.6	35	4.1	5	0.6
US-131 (11 mi.)*	51	4.6	94	8.5	26	2.4

*Mileages reflect the portion of the roadway within the coverage area.

Traffic Management Center News

Hours were added or extended for several holidays and special events, including the day after Thanksgiving, the funeral for Gerald R. Ford, the River Bank Run, Memorial Day, the Fourth of July, Labor Day, and Celebration on the Grand. Hours were also extended several Friday evenings during the summer for weekend construction activities.

The MiDrive website was developed for statewide traffic information. Camera images and lanes closure information are provided on the site.

Four local television stations are now using WMTMC video as part of traffic updates and reports. Radio stations are also using camera image available via the Internet to obtain traffic condition information.

Control Room Operators tracked vehicles and recorded travel times through construction zones. This data assisted the Grand Rapids TSC in calculating delays experienced by motorists as a result of construction zones. Control Room Operators also assisted in testing the accuracy of a vehicle detector.

Compiled by: URS

West Michigan TMC

Fiscal Year 2007

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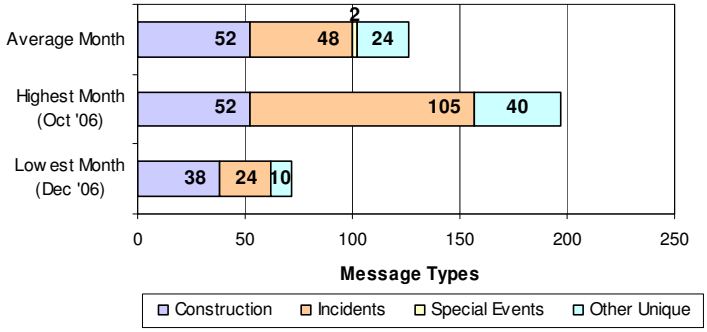
Traveler Information Activity

- The MDOT ITS Control Room provides traffic information to freeway users via 10 dynamic message signs (DMS) positioned in key locations along the freeway system in the greater Grand Rapids area.

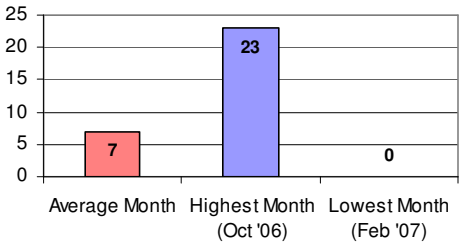
Unique DMS Messages by Type



Top Three Utilized DMS

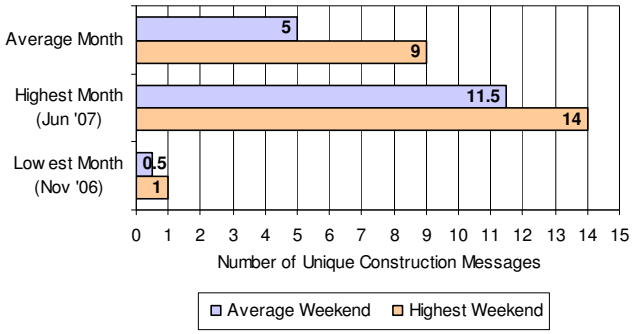
1. Northbound US-131 at 28th Street
2. Westbound I-196 at Plymouth Avenue
3. Eastbound I-196 at Chicago Drive

Incident Notification History



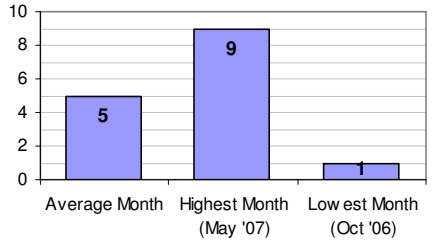
Construction Management Information

Weekend Construction* DMS Message Activity



*Includes Friday, Saturday and Sunday; Excludes January thru March.

Incidents Occurring in Construction Zones*



*Excludes January thru March.

Compiled by: URS

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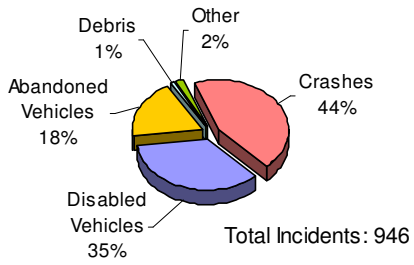
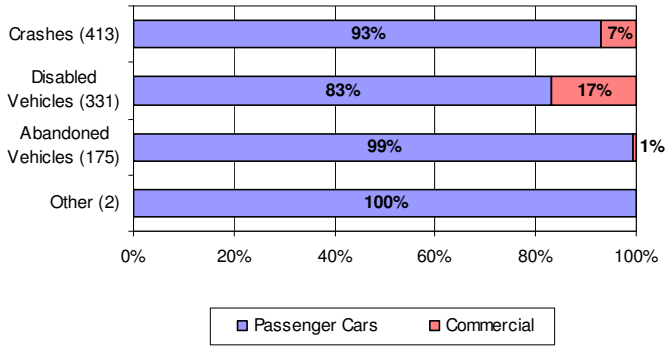
Incident Management Information

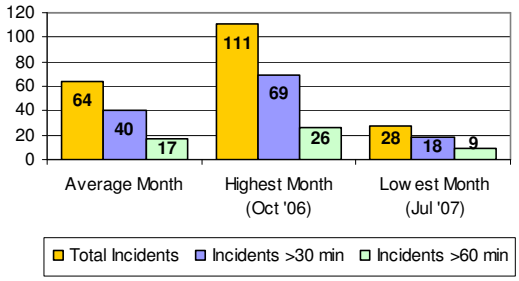
Total Incidents Managed by Type



Vehicle Composition of Incidents

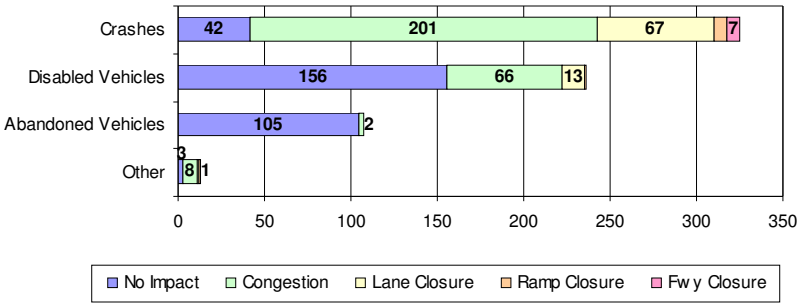


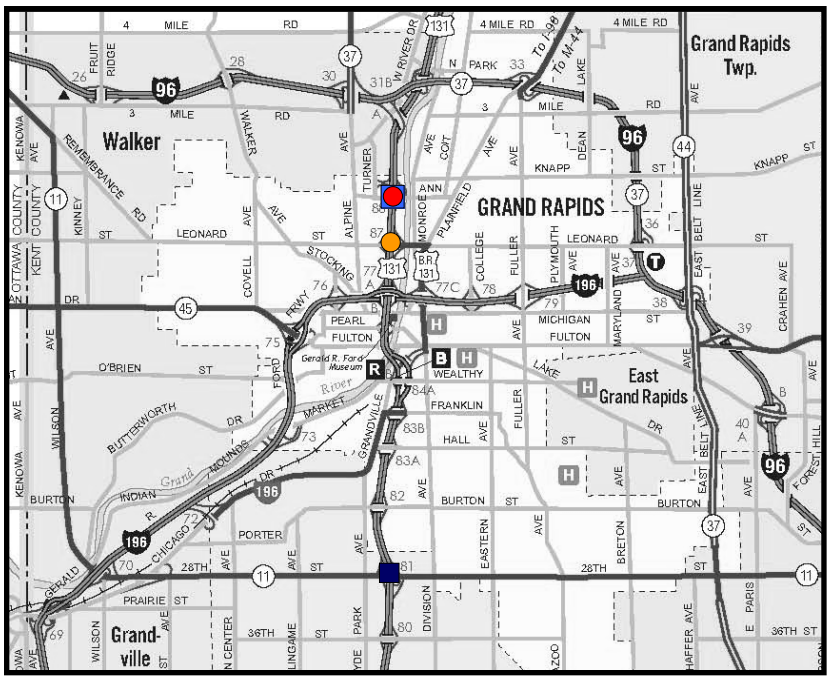
Incident Duration History*



**Incident Duration History* does not include abandoned vehicles.*

Traffic Impacts by Incident Type





Incident Hot Spots

- 32 crashes
- 31 crashes

- 30 disabled vehicles
- 28 disabled vehicles

Compiled by:
URS

West Michigan TMC

Serving the Grand Rapids Area Freeways

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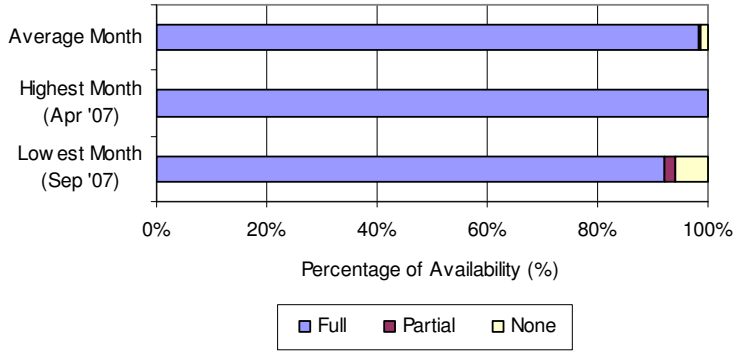
ITS Field Infrastructure Reliability

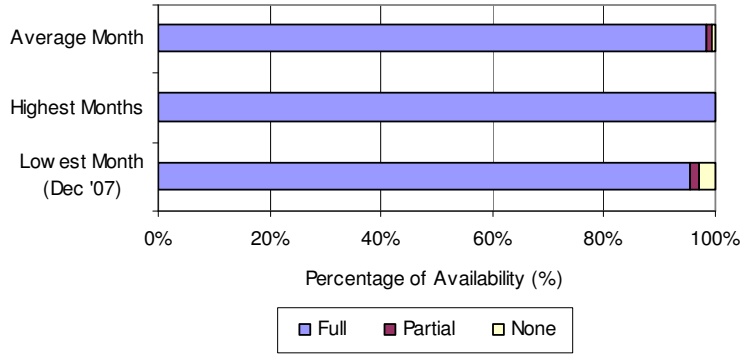
Overall Camera System Availability



Individual CCTV Camera Availability

	Camera	Full	Partial	None
1	US-131 @ 28th St	98.2%	-	1.8%
2	US-131 @ Franklin St	99.2%	-	0.8%
3	US-131 @ Market Ave	99.6%	0.2%	0.2%
4	US-131 @ Pearl St	100.0%	-	-
5	US-131 @ I-196	100.0%	-	-
6	US-131 @ Leonard St	99.6%	0.2%	0.2%
7	US-131 @ Ann St	97.7%	2.0%	0.2%
8	US-131 @ I-96	100.0%	-	-
9	US-131 @ Hall St	99.4%	0.2%	0.4%
10	US-131 @ West River Dr	97.7%	0.4%	1.8%
11	I-196 @ Chicago Dr	99.0%	0.2%	0.8%
12	I-196 @ Lake Michigan Dr	98.0%	1.2%	0.8%
13	I-196 @ Lane Ave	99.0%	0.2%	0.8%
14	I-196 @ College Ave	100.0%	-	-
15	I-196 @ Fuller Ave	99.8%	0.2%	-
16	I-96 @ I-196	88.5%	0.2%	11.3%
17	I-96 @ Fulton St (M-21)	93.9%	5.5%	0.6%

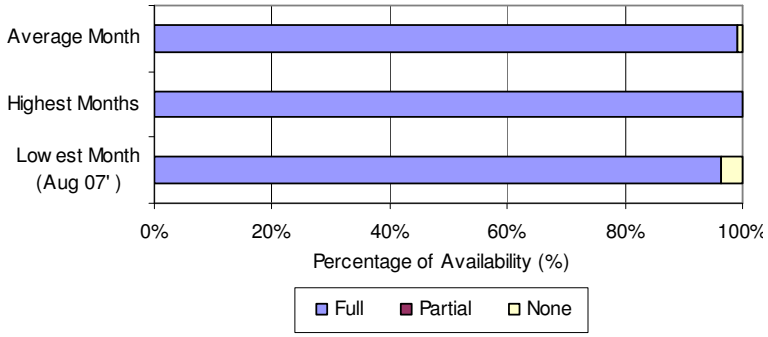
Overall DMS System Availability



Individual Dynamic Message Sign Availability

	DMS	Full	Partial	None
1	WB I-96 @ Fulton St (M-21)	99.0%	-	1.0%
2	WB I-196 @ Chicago Dr	99.2%	0.2%	0.6%
3	EB I-196 @ Plymouth Ave	100.0%	-	-
4	SB US-131 @ West River Dr	95.9%	1.8%	2.3%
5	SB US-131 @ Ann St	99.0%	0.6%	0.4%
6	NB US-131 @ Leonard St	98.4%	0.6%	1.0%
7	SB US-131 @ Pearl St	99.8%	0.2%	-
8	SB US-131 @ Hall St	97.7%	1.8%	0.4%
9	NB US-131 @ 36th St	97.5%	1.8%	0.6%
10	NB US-131 @ 28th St	97.3%	1.4%	1.2%

Overall VSS System Availability



Individual Variable Speed Sign Availability

	VSS	Full	Partial	None
1	SB US-131 @ Pearl St	100.0%	-	-
2	NB US-131 @ Market Ave	99.4%	-	0.6%
3	SB US-131 @ Market Ave	99.4%	-	0.6%
4	NB US-131 @ Franklin St	97.7%	0.2%	2.0%

Compiled by:
URS

West Michigan TMC

Serving the Grand Rapids Area Freeways

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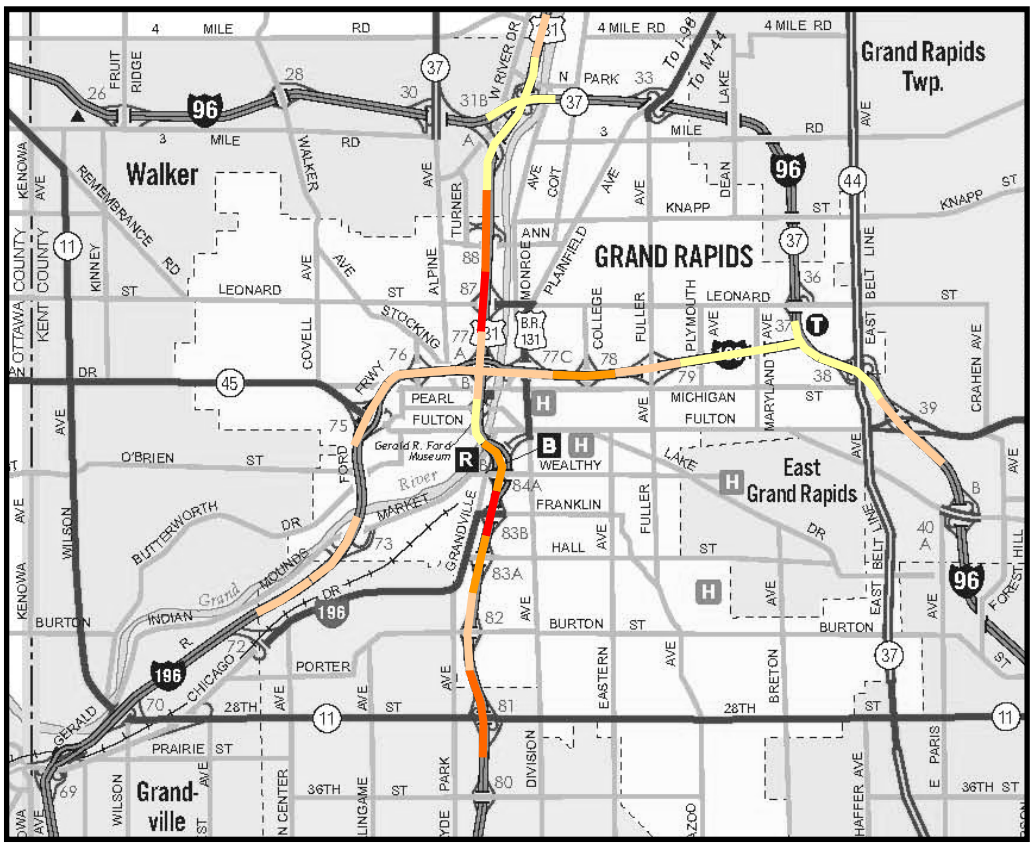
Safety Summary

Incident Density by Freeway Segment



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